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Science News-Letter

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The Weekly Summary of Current Science

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ARCHÆOLOGY

Old Indian Mounds Used as Flood Refuges

The thousands of terror-stricken people who have taken to Indian mounds to escape the flooding Mississippi waters, are showing scientists how the Indians probably used these earthworks which they built in pre-Columbian days.

Each of these mounds, very frequent in this section, can take care of some 500 persons. Sturdily built of earth, they have resisted the onslaught of the waters for generations, and are now pinnacles of safety to the refugees.

The situation today, according to Dr. Alfred Kidder, well-known American anthropologist, is strong evidence in favor of the theory that the mounds were originally built by the Indians a thousand years ago for this very purpose—to afford refuge from floods. Undoubtedly the Indians experienced floods of considerable magnitude and had to find some method of protecting themselves.

"In all probability," said Dr. Kidder, "it was for this purpose that they toiled for years to build these high mounds. It was a gigantic task, since they had only their baskets in which to carry the tons of earth necessary to make them.

"It was at first thought that these mounds might be funeral piles like other smaller mounds in this section and in the Ohio valley, but excavations unearthed no human remains. However, post holes were discovered where the framework of buildings had evidently been erected. Baked clay was also discovered. This clay had plastered the log and twig structure of the building and was hardened into enduring form when the buildings caught fire.

"Were these mounds erected merely as high places for temples as in the case of the Aztec and Toltec pyramidal structures? This was the conjecture. Against this theory arose the remote possibility that the mounds were places of refuge from floods—a theory substantiated by the present situation.

"The buildings were probably temples, altars and the habitats of chieftains," said Dr. Kidder. "In time of flood a mound could accommodate the entire tribe, most of the members of which probably lived in the inundated area."

Pyramidal in structure but with a flat top to permit erection of buildings, the mounds are about 150 feet in diameter and some fifty feet high. They are largely confined to the flood area of the Mississippi. A number occur, however, in areas in the valley which are not completely inundated in flood time. These were probably built later, Dr. Kidder said, in the manner of primitive peoples after the erection of such mounds had become a custom. The funeral mounds, on the other hand, are much smaller and lower and occur frequently in both the Mississippi and Ohio valleys.

Science News-Letter, May 7, 1927

METEOROLOGY

Flood Began Last September

The greatest flood in Mississippi River history, now raging, gave the first grim warning of its approach eight months ago.

"The present flood began late in August when heavy rains set in, raising the waters of one or two rivers in Kansas and Oklahoma," said H. C. Frankenfield, head of the division of rivers and floods of the U. S. Weather Bureau.

"In October there was flood in the Arkansas and Neosho Rivers with damage of $40,000,000, or perhaps more. Last fall, I saw mud clots on ten-foot corn stalks, out in the prairie. Then, the rains drifted east-

(*Just turn the page*)

ANCIENT INDIAN MOUNDS in flooded Mississippi, now used by refugees. It is suggested by archæologists that the Indians who built them have used them for similar purposes

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Floods Foretold

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ward, over Missouri, Illinois, Ohio, Tennessee, Kentucky, and the Cumberland. And all this was at a time of the year when the rivers of the Mississippi system should have normally been at their lowest level.

"We knew then that if the rains of the coming winter and spring were much above normal, we were going to have a big flood. But we can not forecast rains, and of course we could not predict the volume of the present torrent.

"Late in December rains swept Tennessee and Kentucky, and the next report was that all records were broken in the Cumberland River and there was a high flood in the Tennessee, and these are the two largest tributaries of the Ohio River. Heavy rain put the Ohio in flood in January, and then the rains became more widespread. During March, every tributary of the Mississippi, from the Des Moines southward and eastward was in flood."

"There is no question that the present flood is the greatest that has ever covered the Mississippi," said Mr. Frankenfield. "The flood of 1922 was the next greatest, and that of 1882 ranks third."

Flood warnings are sent out from the U. S. Weather Bureau every day in the year to some part of the United States, sometimes four weeks in advance, sometimes only 18 hours, Mr. Frankenfield stated. The Mississippi flood waters gather from such distant streams and have been studied so long and carefully that height and speed of the spring flood in the lower Mississippi can usually be estimated by bulletins several weeks before it sweeps through Louisiana.

"The prediction of floods is per-

(*Continued on page* 297)

News-Letter Features

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Modern Hospitals Try Medicine Men's Music

By Emily C. Davis

Healing songs of the old Indian medicine man—can they do anything for diseased minds and bodies of white men?

It seems a far cry from the clean white stillness of the up-to-date hospital to the painted medicine man decked out in his beads and rattles, singing a chant-like melody in the tent of a wounded brave. But it is sometimes discovered that ancient and primitive physicians had a kernel of true knowledge concealed in their pageantry of rites and charms and magic potions.

In recent years, doctors have rediscovered the health-giving properties of sunlight, which Greek doctors of the fourth century B. C. prescribed for their patients.

The importance of keeping a sick man from becoming depressed and frightened over his condition has lately been stressed in scientific papers read at meetings of doctors, following somewhat after the pattern set down by a thirteenth century physician, Henri de Mondeville:

"Keep up your patient's spirits," wrote de Mondeville, "by music of viols and ten-stringed psaltery, or by forged letters describing the death of his enemies, or by telling him that he has been elected to a bishopric, if a churchman."

It must be added that the modern physician does not advocate the use of faked stories to put the patient into a favorable frame of mind for recovery. But the medieval doctor had a twentieth century idea, that emotion may play a strategic part for good or bad in a battle with disease.

And now, the primitive Indian medicine man may have a contribution to make to modern medicine. At least, the possibility is being investigated.

Medicine Men Knew Symptoms

The idea seems less fantastic when the character of Indian medicine songs is recalled. Miss Frances Densmore, of the Bureau of American Ethnology, who during the past twenty years has lived on many Indian reservations, collecting music of primitive singers, says that the medicine man was not just a wild whooping savage. The medicine man was observant, and he had technique. He did not understand diseases, but he knew that certain symptoms in a patient's appearance were good and other symptoms were bad. He concluded by trial and effect that certain remedies and methods of procedure produced the desired improvement in the patient.

The old Indian doctors were called in to treat people who were very ill, Miss Densmore explains, for the Indians had a strong hold on life and did not give up easily. Thus, music was used by them, not in mild "nervous" ailments, but in extremes of human suffering, cases that a doctor or surgeon would call major cases.

The songs which the medicine man used came to him in psychic dreams and were reserved for the express purpose of treating a type of sickness. The way in which the songs were acquired gave them an atmosphere of authority, and the medicine man sang them with great faith in their effectiveness. The confidence of the Indian physician in his ability to cure was intended to impress the sick person and make him feel that he was going to get well.

"A Yuma medicine man told me that he would not let people cry in the room while he sang," Miss Densmore says. "Any one who came into the room was to go about naturally and not depress the patient."

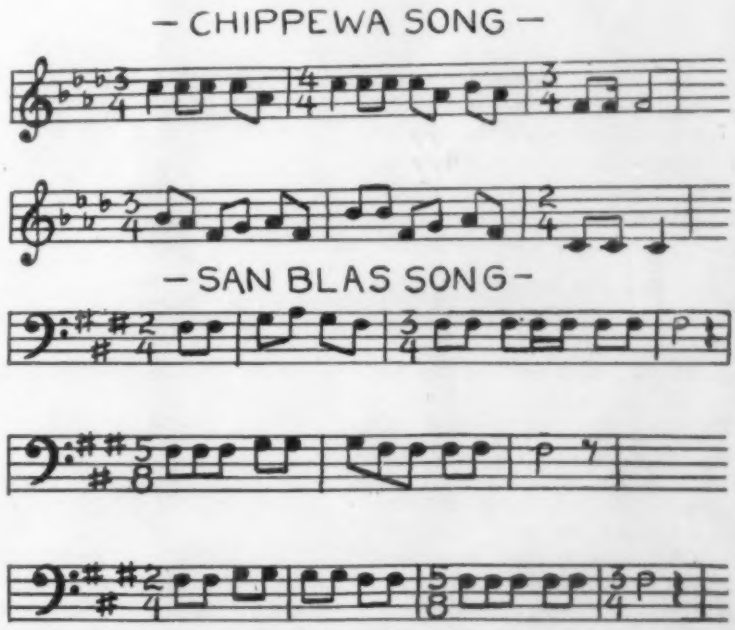
Songs Are Soothing

As for the medicine songs themselves, Miss Densmore has found that the majority are of the soothing, quiet, but reassuring type. The rhythm was the important thing, not any beauty of melody, though some of the songs have that too.

It is because of these strange, vibrant rhythms that the Indian music has been tested out in a preliminary experiment with mental patients. These first tests were made in the Manhattan State Hospital in New York City. They were conducted at the suggestion of Mr. Willem Van de Wall, of the Bureau of Mental Health, of Pennsylvania, who has for some years been using music in various ways in mental hospitals.

Two songs, both from Miss Densmore's collection, were presented to patients in this hospital. The first was a melody with a soothing rhythm used in treating headache by a San Blas medicine man, one of the so-called White Indian tribe of Panama. This was sung in the New York hospital just as the Indian had sung it for Miss Densmore's phonograph record, except that his words were put into English:

"I bring sweet-smelling flowers and put them into water,
I dip a cloth in the water and put it around your head,
Then I bring a comb, part your hair smoothly, and make it pretty.
Every one comes to see you get better.
And I tell you that you will never be cold again.
Go to sleep and dream of many

(*Just turn the page*)

SAMPLES OF INDIAN MEDICINE tried for the first time on the white man.

Hospitals Try Music

(*Continued from page 287*)

animals, mountain-lions and sea-lions,
You will talk with them and understand what they say.
When you wake you will be a doctor, like me."

Dr. Geoffrey C. H. Burns, of the hospital staff, who made the tests, states:

"In regard to the headache music, there is no doubt that this has a definite effect. The effect is that of rather intense and somewhat bizarre vibrations, which are transmitted to the patient. Certainly, in such cases of headache, due to stasis or congestion, this seems to have a beneficial effect. The effect, however, is rather temporary, and at present I am unable to make positive statements."

Song By Sick Man

The other song was an unusual piece of music, sung by an old Chippewa Indian who was bedridden. Ordinarily, Miss Densmore explains, the medicine man sings to help the patient. But in this instance a Chippewa medicine man sent an old Indian invalid a drum with the message that he was to play on it. The Indian worked out a cheerful bit of rhythm, which he played over and over again, and in time, Miss Densmore was assured, he got well.

The song which this Indian composed for himself is unique in that it has a distinctly stimulating effect, somewhat like that of a softly played march, with its snap and precision. After hearing it, the collector looked over her files of 1,600 songs and could find no other medicine song with this stimulating quality. All the rest were quieting rather than stirring.

This song was tried out by Dr. Burns on 20 mental patients of a depressed or suicidal type. These patients are so shut-in to themselves that it is hard to find anything to interest or arouse them from their apathy.

Tried On Insane

The twenty patients were seated comfortably around a room, knowing nothing about the music or its use. Then the Chippewa melody, which had been arranged for strings and flute by Carl Busch, was played by a small orchestra. After an interval it was played again, the whole process taking about twenty minutes.

During four weeks this experiment was repeated a number of times with the same group of mental cases.

That the music had a decided influence there is no doubt, says Dr. Burns. None of these dull depressed patients remained stolid. Three were aroused so that they talked rathe freely, which they had not done before. Five patients were moved to tears, three on the first day, the othe two on the third day. But even thi reaction is considered favorable in patients who go on from day to day without expressing emotion in any visible form. When once they let themselves go even a little, they are more likely to respond to other sensations and other situations. Two of the patients refused to sit in after the second session, finding the music too distressing. The other cases showed slighter effects, though beneficial ones.

AN INDIAN MEDICINE MAN, writing a prescription

Dr. Burns points out that the tests were not made with scientific precision, and that the results are tentative.

He says: "Certain facts were noted and are of sufficient value to warrant further investigation along this line."

Science News-Letter, May 7, 1927

Flowers are more abundant and colorful in mountain regions than in lowlands.

Rabbit raising has become so popular an industry that government scientists have written a new bulletin on the subject.

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On Translating Science

By Edwin E. Slosson

(From an address to be delivered at the Annual Meeting of the American Association for Adult Education, Cleveland, May 16, 1927.)

Science is advancing so swiftly nowadays that one has to run hard in order to stand still, like Alice in Wonderland. In several of the sciences more progress has been made in the first quarter of the twentieth century than in many centuries previous. When a man, who thought he had "finished" physics or astronomy in college twenty-five years ago, takes a look in a modern textbook, he finds it is as bewildering as his native village when he returns to it after it has become a city. The familiar landmarks are lost and the faces are strange, because new streets have been laid out and his friends have grown up. In the recent rapid progress of science few of what formerly were called facts have had to be discarded, but so much has been added and the whole scheme so radically revolutionized that the new aspect is unrecognizable. The area of information added to some of the sciences in the present century is greater than their original sphere.

As investigators push forward in their several branches of science, like spokes in a wheel, they get farther and farther away from one another as well as from the common center of the community. A specialist has been defined as "one who is learning more and more about less and less." The greater the number of specialists the greater the need of a generalist. The more technical a topic becomes the more important and difficult becomes the task of translation into the vulgar tongue. Sensational discoveries in applied science have followed one another so fast of late that the public has become dazzled and indifferent. With all the multiplication of schools, libraries and all the agencies for adult education, it is questionable whether science has gained greatly in the shaping of the public mind. A recent writer in Nature says:

"The average 'educated' man of today knows less and cares less about the natural world in which he lives than did the 'educated' man of the Victorian era."

The fact that scientists have been compelled to construct a trade language of their own is undoubtedly one reason why they are commonly misunderstood and disesteemed. It is hard not to feel that a foreigner who does not speak our language is not a bit stupid or crazy. Then, too, our pride comes into play and constructs a defensive mechanism for us. Our subconscious self suggests to us to say: "Well, if he can't put it into plain English I guess it does not amount to much anyway." This is the time to be reminded of an observation by Quiller-Couch:

"I hold there is no surer sign of ill-breeding than to speak, even to feel, slightingly of any knowledge oneself does not happen to possess."

Translating science from technical language into the vulgar tongue is essentially the same task as translating from a foreign language into the vernacular and involves the same difficulties. No two vocabularies, whether in the same or different languages, fit exactly word for word. The aim of the translation is to express the essential idea in the new terms. In some branches of literature, for instance, the imaginative and symbolic, perfect translation is impossible. Poetry of the highest order can be only inadequately rendered in another language. The same is true of certain sciences, mathematics for instance. Any mathematical formula can be completely expressed in ordinary language but this expression would be so wordy and complicated that no mind could grasp it. The same is true of music. It would be possible to state in words the wave length and duration of every note or the position of each dot and line on a page of music, but such a description would fail to convey the vivid instantaneous impression that the musician receives when his eye strikes a sheet of music. So mathematics, like music, being expressed by a complex and technical system of symbols, cannot be put into plain language without material loss. But the results of a mathematical process can and should be translated into common speech. This point is important since all the sciences are becoming more and more mathematical so far as they can accomplish this aim.

The popularization of science does not mean falsification but its translation from technical terms into ordinary language. Popular science need not be incorrect, but has to be somewhat indefinite. It differs from the exact sciences in being inexact. Popular science may be defined as science in round numbers. The scientific mind is set at too sharp a focus for ordinary use.

Since the object of a translation is to carry over the essential idea so that it will, so far as possible, make the same impression upon the reader in its new form as the original was designed to do, a literal translation is often a misleading version. A missionary translating the New Testament into the Eskimo language rendered the phrase "The Lamb of God" as "God's Baby Seal." This was literally a lie but essentially a true translation.

To make a true translation requires the ability to "Put yourself in his place." It is not sufficient to know what you yourself mean by what you say, you must also know what the other fellow means by what he says. It is lack of this sympathetic insight into the mind and language of another that is the cause of the main difficulty in "getting science over." The professional scientist, like the provincial patriot, is apt to pride himself on saying: "I speak no language but my own," and since the layman cannot possibly learn the technical vocabularies of all the sciences he remains for the most part unaffected by scientific thought. This also was the chief cause of the controversies and misconceptions of science prevailing in the world at large.

But I venture to say that the effort to translate pure science into the vernacular would be a useful exercise to the scientists themselves. I have spoken of mathematics as being the most difficult to put into popular language, but a French mathematician, Gergonne, said a hundred years ago, "We cannot flatter ourselves that we have completed a theory until we can explain it in a few words to a man in the street." And Tolstoy holds the same opinion for he said, "A man could explain Kant to a peasant if he understood Kant well enough."

Certain scientists seem afraid to get off their own ground. They dare not descend from the platform to the street. They cannot talk unless they hold a piece of chalk in their hand. Now chalk is essential when talking about the cretaceous formation in geology or about marble in mineralogy, but it is not necessary otherwise. Archimedes could teach a lesson in geometry and Jesus could teach a lesson in ethics by drawing on the sand.

PHOTOGRAPHS OF SCIENTISTS

Science Service has a collection of nearly 2,000 photographs of scientists throughout the world. The fourteenth installment of this list is published below. Although this list has been checked with care, corrections are requested, since a complete catalog will be issued later. Photographs of scientists not listed are desired.

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1333 Yunthers, Edmund C., Plant Collector, Univ. of Michigan

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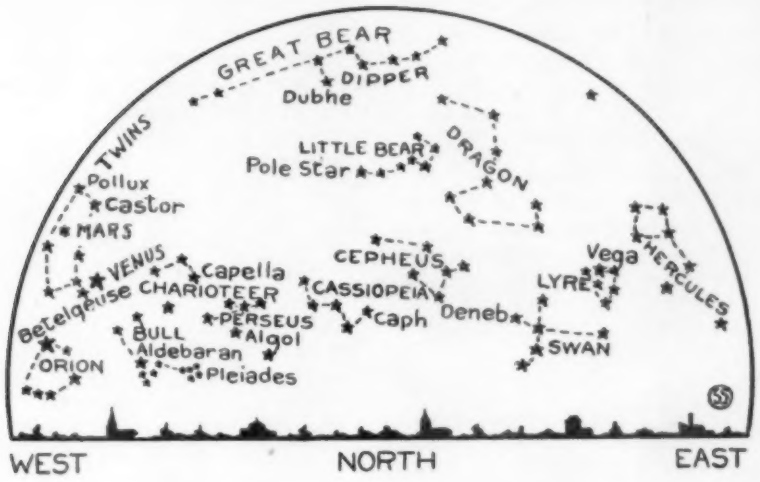
Venus Brilliant in May Evening Skies



By James Stokley,

Look to the western sky this evening after sunset. Even while twilight is still very bright, you will be able to see the planet Venus, which is now the brightest of any of the visible stars or planets. A few months ago this interesting orb was too near the sun to be visible; then, as it drew eastward from the sun, it became brighter, until it will be at the maximum brightness in August. Then it will become fainter, at the same time drawing towards the sun until it is no longer visible in the evening, but becomes a morning star.

The cause of all this is found in the position of the path of Venus. It is a planet, like the earth, and so revolves around the sun. The orbit of Venus, however, unlike that of Mars, is within the orbit of the earth. Once in every revolution it comes between the earth and the sun, and also the sun comes between the earth and Venus as often.

As a result of these relative motions of the earth and Venus around the sun, that planet shows phases like the moon. When it and the earth are on opposite sides of the sun, Venus is full, just as the moon is full when the sun and the earth are on the same side of it. Then, as Venus moves in its orbit until it is to one side of the sun, as seen from the earth, a position that the astronomer calls "quadrature," the planet appears like a half moon, when viewed through a telescope. As the planet is not transparent, only the half towards the sun is illuminated, and when it is in quadrature, we only see half of the illuminated portion.

Venus Shows Crescent Phase

Then, when the planet begins to come between the sun and the earth, we see even less than half of the illuminated portion, and the planet appears as a crescent. But when Venus undergoes the change in phases, unlike the moon, it changes in apparent size as well. The orbit in which it revolves is 134 million miles in diameter. When it is between the sun and the earth it is only 26 million miles from us, but when it is on the opposite side of the sun, there is a gap of 160 million miles separating us from our neighbor planet. The result is that the full Venus is very much smaller, and fainter, as well, than the crescent phase.

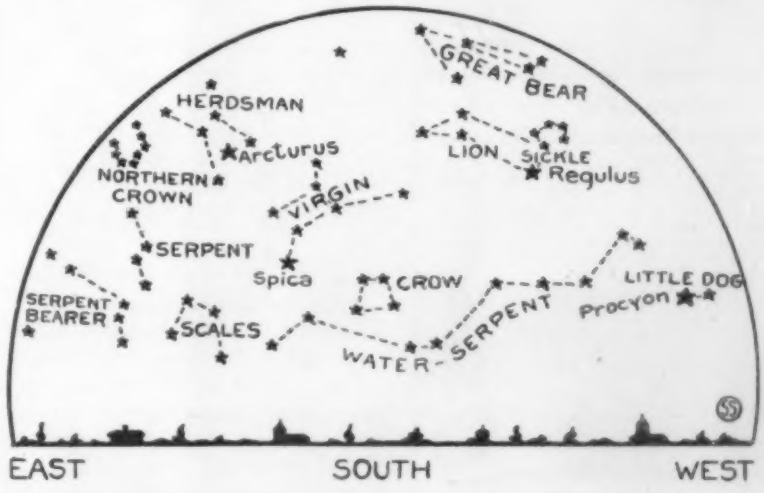
All these changes, of course, are not visible to the unaided eye, but Venus itself is a most conspicuous object, and so people saw it for thousands of years before they were aware of the changes that it was undergoing, literally before their eyes.

It remained for the great Galileo, who, in the year 1610, first turned a telescope on the heavens, to find that Venus showed changes in phase, a discovery which had a great effect on the acceptance of the then recently proposed Copernican system. Previously, the Ptolemaic theory had been widely accepted, and men thought that the earth was at the center of the universe, with the planets revolving around it. A mere rotation of the planets around the earth, however, was not sufficient to explain some of the complicated motions, for sometimes the planets move one way among the stars, and sometimes another. To reconcile the theory with the observed motions, they introduced epicycles. That is, a planet moved in a circle around a center which itself might move in a larger circle around the earth. The smaller circle was the epicycle, and sometimes it was necessary to have half a dozen or more epicycles on top of each other to explain the motions of the planets.

Proposed Motion of Earth

It was in 1543 that Copernicus published his famous "De Revolutionibus Orbium Coelestium," "On the Revolutions of the Celestial Orbs." In this book, the first copy of which was handed to the great Polish scientist as he lay on his death bed, the much

(*Just turn the page*)



THIS MAP, and the one above, show the evening skies as they appear in May. Hold this page in front of you, and face either north or south. The upper or lower map will then show the heavens as they appear to you

May Skies

(*Continued from page 291*)

simpler plan was suggested for the universe of putting the sun at the center, with the earth and the other planets revolving around it. With the earth and the other planets moving as well, the apparent motions of these bodies could be explained just as well as by the Ptolemaic theory. The Ptolemaic theory did not fall because it did not fit the facts, for it did, but the Copernican idea explained them just as well, and in a much simpler way. Of two possible explanations scientists usually accept the simpler one.

But for many years after 1543, the idea that the earth was not at the center of the universe proved too radical for general acceptance, and the religious authorities, the fundamentalists of the day, fought hard against the Copernican theory. Galileo Galilei, to give him his full name, however, was more progressive than the orthodox scientists of the time, and so he soon accepted the ideas of Copernicus. In 1610, when he heard that a Dutch spectacle maker was said to have made a glass that made distant objects seem close, and with no knowledge of the Dutchman's method, he constructed a telescope. Though it was inferior to a good pair of modern binoculars, it was the first telescope to be pointed at heavenly objects, and so his discoveries were many.

Galileo Discovered Venus Phases

For the first time, Galileo saw the four larger moons of Jupiter, revolving around their parent planet. This was one of the first scores for the Copernican theory, for here, in the heavens, was a miniature of the solar system which it proposed. But more conclusive evidence was obtained when he turned his little glass on Venus, and watched it for a while. Then he saw that it underwent phases like the moon, a phenomenon which could not possibly occur with the Ptolemaic arrangement, for it placed the path of Venus inside that of the sun. Therefore, it could never get farther away from the earth than the sun was, and could therefore never show us more than half of its illuminated surface. When Galileo, then, found that it showed a full phase, as well as the crescent, it was a powerful argument in favor of the newer ideas.

The unpopularity of the ideas of Copernicus, however, made it unsafe to be too much in favor of them, and so Galileo showed strange caution about announcing his discovery in regard to Venus. He wanted to furnish some proof that he had seen the changes in phase, but on the other hand, he wanted to keep his discovery secret for a time. So he announced it in the form of an anagram; which he sent to his friend John Kepler: "Haec immatura a me iam frustra leguntur: o. y." (These things, not ripe, by me are read in vain.) Later he announced the solution. By transposing the letters, it read "Cynthiæ figuras æmulatur Mater Amorum," which means in English, "The Mother of Loves (Venus) imitates the phases of Cynthia (the moon)." A few months later he revealed the solution.

Mars and Saturn Visible

This month Venus will be seen regularly in the western evening twilight. On the third, the moon will be with it. At 2:17 a. m. the next morning, eastern time, Venus and the moon will be in conjunction, which means that the two bodies will be close together. At the time they are closest, however, both will be below the horizon for Americans, but the previous evening the two will be close, with Venus above the young crescent moon. Mars is also visible, a little higher in the sky, and to the south, and on the afternoon of the fifth, the moon will be in conjunction with it. closest, when Mars will be less than a lunar diameter north of the moon. By evening, when Mars can be seen, they will have separated to some extent, but will still be close together. The planet Saturn, the most distant of the planets that can be seen with the unaided eye, is visible later in the evening in the east, in the constellation of Ophiucus. On the 26th of the month, it is in opposition to the sun, which means that the planet rises in the east just as the sun sets in the west, and so it is visible all night and directly south at midnight.

Science News-Letter, May 7, 1927

The first practical method of treating wood to prevent decay was devised early in the nineteenth century to save the British Navy.

On the barren island of Kerguelen, in the South Indian Ocean, the French Government has deposited a ton of preserved beef, half a ton of biscuits and matches and clothing for use of possible shipwrecked vessels.

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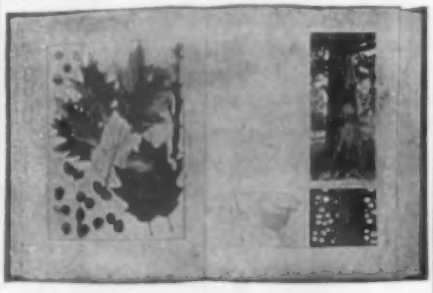

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BIOGRAPHY

Morgan Heads Academy

Prof. T. H. Morgan of Columbia University, one of the world's foremost authorities on hereditary processes and evolution in animals, was elected president of the National Academy of Sciences at the annual meeting of this distinguished body of scientists in Washington. Dr. F. E. Wright of the Carnegie Institution of Washington, who is at present conducting brilliant researches on the material the moon is made of, was chosen as vice-president, and Dr. David E. White of the U. S. Geological Survey was re-elected home secretary.

Three new members were elected to the Academy's governing Council: Prof. George E. Hale of the Mt. Wilson Astronomical Observatory; Dr. John C. Merriam, president of the Carnegie Institution of Washington, and Dr. J. McKeen Cattell, editor of *Science* and several other leading scientific publications.

At the meeting of the executive board of the National Research Council the following general officers were elected: chairman, Gano Dunn, president of the J. G. White Engineering Corporation, New York City; first vice-chairman, Prof. T. H. Morgan, president-elect of the National Academy of Sciences; second vice-chairman, John C. Merriam, president of the Carnegie Institution of Washington; third vice-chairman, R. A. Millikan, California Institute of Technology, Pasadena.

The permanent secretary of the National Research Council, Dr. Vernon Kellogg, and the treasurer of the Research Council, Dr. George K. Burgess, director of the Bureau of Standards, continue in these offices. To replace vacancies occurring in the membership at large of the executive board, James F. Norris, professor of Organic Chemistry, Massachusetts Institute of Technology, Cambridge, Mass.; F. R. Moulton, professor of Mathematics, University of Chicago, and president of the Sigma Xi, Chicago; and John R. Freeman, consulting engineer, Providence, were elected.

This year's award of the Agassiz Medal of the National Academy of Sciences has been voted to Dr. Max Weber, emeritus professor of zoology of the University of Amsterdam, internationally recognized as an authority on marine mammals and fish, and for many years engaged in oceanographic work. The Agassiz Medal is awarded for outstanding research in oceanography.

Science News-Letter, May 7, 1927

BIOGRAPHY

Edison Elected To Academy

Thomas Alva Edison, famous American inventor, was elected to membership in the National Academy of Sciences, America's most eminent scientific organization, at its recent meeting in Washington.

Other elections include:

Eric Temple Bell, mathematician of the California Institute of Technology, Pasadena, California.

Charles Peter Berkey, geologist of the American Museum of Natural History, who has recently made investigations of the ancient rock layers of Asia.

William Bowie, chief of the division of geodesy, U. S. Coast and Geodetic Survey, Washington, an authority on the earth's crust, especially isostasy.

Arthur Holly Compton, physicist of the University of Chicago, who discovered the important relation between the wave-length and the reflection of radiation that is called the "Compton effect."

Benjamin Minge Duggar, botanist of the Missouri Botanical Gardens, St. Louis, internationally known for his work on plant diseases and plant physiology.

Rollins Adams Emerson, geneticist of Cornell University, who is famous for his work on the breeding of plants.

Herbert McLean Evans, anatomist of the University of California, who discovered the fertility vitamin, E.

William King Gregory, anatomist and anthropologist of the American Museum of Natural History, one of the leading authorities on the evolution of man and related animals.

Edwin Powell Hubble, brilliant young astronomer of the Mt. Wilson Observatory, Calif., who made known the "island universes" that lie at vast distances in outer space.

Claude Silbert Hudson, chemist at the U. S. Bureau of Standards.

Alfred Newton Richards, professor of pharmacology at the University of Pennsylvania and associate editor of the *Journal of Biological Chemistry*.

Francis Peyton Rous, physiologist of the Rockefeller Institute for Medical Research, New York City, who has done fundamental work on the nature of cancer.

Albert Sauveur, professor of metallurgy at Harvard University and

(*Just turn the page*)

BIOLOGY

THOMAS HUNT MORGAN

Interpreter of Chromosomes

The election of Prof. Morgan to the presidency of the National Academy of Sciences, the highest honor which can be conferred by votes of American scientists, marks a high point in a most distinguished career. For a quarter of a century he and his numerous pupils have been making biological history at Columbia University.

When Gregor Mendel sought a key to the riddle of evolution, the question of the manner of the transmission of hereditary characters, he found — what had not been suspected before and was not after him, either, for a generation—that these characters were not continuous, boundaryless, blending things, but sharply distinguishable units that could stand up and be counted and dealt with statistically. But Mendel worked and died without any suspicion of how these units are marshalled and marched about in the divisions of the reproductive cells of plants and animals. It remained for Prof. Morgan and his school to take a foremost part in the discovery of the correlation between the shifting and rearrangement of hereditary characters and the shifting and rearrangement of the minute bits of protoplasm called chromosomes within the living cells. What the great Austrian began the American carried to conclusion.

Science News-Letter, May 7, 1927

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SCIENCE SERVICE

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Edison Elected To Academy

(*Continued from page 293*)

internationally recognized for his work on iron and steel.

Henry Van Peters Wilson, professor of zoology at the University of North Carolina, authority on sponges and the lower vertebrates.

As foreign associates, the following scientists were elected:

Paul Sabatier, chemist of the University of Toulouse, France, who discovered how to convert waste cottonseed oil into fat, and coal into synthetic petroleum by the use of metal catalysts.

Godfrey Harold Hardy, Savillian professor of geometry at the University of Oxford, England, internationally known for his researches in pure mathematics.

Carl Stumpf, emeritus professor of philosophy at the University of Berlin, originator of a new theory of sound and music.

Science News-Letter, May 7, 1927

Do You Know That—

The Arctic poppy is one of the flowers of Greenland.

A new canning process invented by an Italian is said to make fish more practical for tropical countries.

A third attempt to introduce the Ayu, one of the best Japanese food fishes, into California has been unsuccessful.

The Bureau of Public Roads has developed an instrument that determines accurately the relative smoothness of a highway.

Australia's new capital city, Canberra, was designed by a Chicago architect and is similar in plan to the city of Washington.

After drilling a well to a record-breaking depth of over a mile and a half, in Southern California, engineers failed to strike oil.

Flower garlands were sometimes worn at bacchanalian feasts in ancient times because of a belief that this warded off intoxication.

Broom corn, the plant which is supposed to have brought the corn borer into this country, is not very susceptible to attack from this serious pest.

More Eyes and Ears---

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EVOLUTION

Apes—Or Something Else?

The abandonment by science of the theory that man descended from the ape is urged by Dr. Henry Fairfield Osborn, president of the American Museum of Natural History and leading authority on the evolution of man. Delivering the principal address of the bicentenary celebration of the American Philosophical Society, Dr. Osborn declared that the ancestors of modern man were "dawn men," who in geologic time known as Oligocene sprang from an animal stock from which also rose independently the anthropoid apes.

The antiquity of man is thus set at millions instead of thousands of years, the apes are made more remote cousins of man, and the whole drama of man's climb upward from ancient animal to civilization is made more lengthy although more direct.

"The Age of Man or the Pleistocene can no longer be regarded as Act I of the prehistoric human drama," Dr. Osborn said, "but rather as the final act, because at the very beginning of the Pleistocene, we find the human race well established and widely distributed over the earth.

"The prologue and the opening acts of the human drama occurred way back 16,000,000 years ago in the Upper Oligocene Period. At this period, or before, the family of man sprang from a stock neither human nor ape-like but possessing certain common attributes which have been transmitted over this very long period of time to variously branching races of human beings on one hand and to variously branching races of anthropoid apes on the other."

Northern Asia was the home of the dawn men, the progenitors of modern men. Dr. Osborn described the Hominidae, as he calls the dawn man family, as ground-living, cursorial, alert, capable of tool-making, and living in the relatively open country on the high plateaus and plains of Northern Asia.

It is from such a source that the modern races of men originated, Dr. Osborn believes. Early in the dawn of human history this parent highbrow stock, risen above its animal beginnings, flourished and dominated the great continent of northern Eurasia. And it is in Mongolia that Dr. Osborn believes there will soon be found the pro-man, the "dawn-man," the missing links between the Australoid, Negroid, Mongoloid and Caucasian peoples of today and that common ancestor of man and ape.

At the time that the dawn men were developing human characteristics in the rigorous climate of Northern Asia, a great empire of low-browed Neanderthaloid races extended over the whole of Europe, Northern Asia and the West of Asia. These human-like creatures with overhanging eyebrows, low retreating foreheads, massive jaws, and retreating chins, were not the direct ancestors of modern men, but another branch of the family that did not acquire superior intelligence on account of the easy climatic conditions under which they lived.

The high-browed races of Asia superseded the low-browed races of Europe and in their turn left evidence in quarry and pit of their skill and evolution upward.

Pithecanthropus erectus, the Trinil man, usually considered the most ancient of man's ancestors, was relegated tonight by Dr. Osborn to the obscurity of a left-over from the low-browed Neanderthaloid races. Moreover, Dr. Osborn declared that fossil elephants found with the Java man indicate that he lived in the relatively recent geologic age of Middle Pleistocene instead of the earlier Pliocene time. To the Heidelberg and Piltdown men, Dr. Osborn on the authority of recent geological discoveries assigned much greater antiquity than to the Java man.

Dr. Osborn's conclusions regarding the origin of man are regarded generally as certain to start a considerable controversy, for not all students of evolution are by any means ready to agree with him. Even among his associates at the American Museum a challenger arises. Dr. William K. Gregory holds stoutly for the view, orthodox since Darwin, that man and the apes marched together until a far later date than that assigned by Dr. Osborn for the birth of the human race. At the same meeting of the American Philosophical Society, Dr. Gregory summed up the evidences on the when and where of the beginnings of a distinctly human race that have led him to this conclusion. He disagrees with his colleague's doctrine that man and the apes never were related but sprang separately from a

(*Just turn the page*)

BIOLOGY

NATURE RAMBLINGS

By Frank Thone

Tree Swallow

"When the swallows homeward fly," and similar sentimental songs, are written to be sung more or less mournfully in autumn; but the swallows are actually flying homeward now, in the springtime, and setting about in earnest to seek homes for themselves and the families they will rear during the summer.

The first of all the swallows thus to fly homeward in the time of blossoming hawthorn is the tree swallow. The tree swallow should, perhaps, be given a more modern title: telegraph-wire swallow. For nowadays it will not roost in a tree so long as it can find a wire, and telegraph and telephone lines festooned with these slim, tilting, twittering birds are a very common sight anywhere in the country. They seem to prefer lines that loop along over marshy country, possibly because marshlands produce many insects, which are almost the sole food of these birds, and are invariably caught on the wing. Swallows have very short and very wide beaks, and as they dart swiftly through the air, considerably outspeeding such slow-flighted insects as beetles and mosquitoes, they are in effect small but very accurately aimed living insect nets.

Swallows are among the friendliest of birds, showing little fear of man and readily accepting tenantry in houses which he may build for them. They are social creatures, and like special birdhouses with many little rooms in them, so that they may all live together amicably, after the fashion of families in city apartment houses, though fortunately with much less bickering than sometimes characterizes huddled humans.

Science News-Letter, May 7, 1927

Five kinds of mosquitoes in this country act as carriers of malaria.

The foreign trade of China increased 300 per cent during the past 12 years.

Early Egyptian doctors were also priests.

The horse is the only living one-toed animal.

Paper milk bottles are used by a London dairy.

Bedouins of Arabia believe in a four-cornered earth.

Death Valley, California, has 350 cloudless days in a year.

Artificial silk was first made commercially about 35 years ago.

Tarantulas make themselves useful by eating up large cockroaches.

An American steamer is the first ship to try burning pulverized coal.

An attempt is being made to introduce salmon into the streams of Hawaii.

Body tissues of a human being contain an infinitesimal quantity of nickel.

One-day shopping excursions from London to Paris by air are soon to be started.

The most expensive method of mummifying used by the Egyptians cost about $2,500.

Four-fifths of America's crude rubber imports last year came from British possessions.

Folding wings are made for some large airplanes so that they can be stored in smaller space.

If 23 alphabet letters were used in making every conceivable word in every language, the number of words would exceed 25 with 21 ciphers after it.

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Apes—Or Something Else?

(*Continued from page 295*)

still lower ancestral animal group and evolved side by side, but in diverging lines, through many millions of years. Since 1916 he has accepted, however, Dr. Osborn's theory that beings entitled to be called human have existed since Pliocene times, a million years ago, much longer than most paleontologists have been prepared to admit.

Dr. Gregory was led to doubt the hypothesis of the separate development of man and apes from the beginning by a comparative study of teeth and bones. Long before the time when this separate development is supposed to have started, five or six million years ago, another separate development was beginning among the four-footed mammals, which has resulted in such exceedingly unlike animals as the tapir and the horse. More divergence, Dr. Gregory said, had taken place between the horse and tapir than between the ape and man. And he cited many minute details in which man still resembles the apes, and in which the bones, jaws and teeth of primitive men even more closely resemble the bones of extinct species of apes. He admitted that it would be much more agreeable to human self-esteem to adopt an opposite doctrine, and likened himself to the slave at the ancient royal banquet, whose unpleasant and probably risky job it was to whisper into the king's ear: "Remember that thou also art but mortal."

Science News-Letter, May 7, 1927

EVOLUTION

Was First Man an American?

Has Nebraska produced the most ancient evidence of the existence of man yet known to science?

This question is raised by Dr. Henry Fairfield Osborn, president of the American Museum of Natural History, in a report to the American Philosophical Society in which he reveals that investigations conducted by him in collaboration with Albert Thomson, of the American Museum staff, have unearthed fossil bone implements in geologic strata that are considered some 4,000,000 years old, an age known to geologists as Pliocene.

Since past opinion has been that the most ancient evidences of man were to be found in the Old World, and since claims of the discovery of man in America antedating the Indians, some 25,000 years ago, have been received heretofore with skepticism, the announcement of Dr. Osborn, one of the world's leading authorities on the antiquity and evolution of man, will create great scientific interest.

Over 300 implements of forty different types have been discovered. They are made of the bones of extinct animals that lived in Pliocene times, but time has caused them to be turned into stone. These are the first completely fossilized bones to be discovered, Dr. Osborn stated. Among the animals whose bones are represented in the collection are extinct horses, camels, deer, elephants and mastodons.

The exact locality in which the discovery was made has not yet been announced by Dr. Osborn with further detail than to state that it is in western Nebraska. Dr. Osborn explained that he desired to protect the site from curiosity seekers who might interfere with the scientific investigations. The first of these artifacts were discovered about two years ago, and since that time tractors and other modern machinery have been used in excavating the area. Two localities about 75 feet apart have produced most of the implements.

The fossilized implements are described by Dr. Osborn as of undoubted human origin and of symmetrical shape. Among them are skin dressers for cleaning animal hides, pointed awl-like implements evidently used in sewing, neck ornaments made of strung bones, and a kind of comb that seems to be a tattooing implement. Eighteen of the types of tools have been matched with counterparts found in the ruins of cliff dwellers of the arid regions of the Southwest, and one type can be nearly duplicated by a much more recent implement from the shell heaps of eastern America. Dr. Osborn declared that the fossilized bone specimens must be studied by others before it will be safe to definitely assign them a human origin. But unlike the implements of Europe, which are usually weapons and hunting tools, the Nebraska artifacts are nearly wholly related to the peaceful arts.

Dr. Osborn announced that further investigations are to be carried on this summer.

Science News-Letter, May 7, 1927

Olive lionheaded goldfish is a recent import to America from the Orient.

Tests show that an aviator can talk with the ground by special apparatus from a height of a mile.

First Glances at New Books

FIRST CROSSING OF THE POLAR SEA—Roald Amundsen and Lincoln Ellsworth—*Doran* ($5). In addition to the main narrative of the principals in this outstanding triumph of adventure-plus-science, their associates also contribute chapters on their several parts. The book is a fascinating narrative as well as a valuable record, and its value is increased by the excellence of its illustrations and general makeup.

Science News-Letter, May 7, 1927

BIRDS OF CENTRAL NEW YORK MARSHES — Aretas A. Saunders — *Roosevelt Wild Life Bulletin, v. 3, no. 3.* Description of the marsh birds of New York plus an appeal to save them from extinction by preserving Central New York marshes.

Science News-Letter, May 7, 1927

STANDARDS YEARBOOK: 1927—National Bureau of Standards—*Government Printing Office* ($1). A comprehensive review of a year's progress in making things run better by fitting them together better, with summaries of all kinds of standards and measures.

Science News-Letter, May 7, 1927

TO BEGIN WITH—Raymond Pearl—*Knopf* ($1.50). The annotations to this reading list for graduate students in science are perhaps as entertaining as the venerable authorities they describe. The distinguished author evidently cherishes the belief that embryo scientists, if sufficiently and discriminatingly exposed, may be led to assimilate a certain amount of general culture.

Science News-Letter, May 7, 1927

HEIR OF ALL THE AGES—N. K. McKechnie—*Bobbs Merrill* ($2.50). Graphic portrayals of typical sections in the history of man going back to his most primitive beginning.

Science News-Letter, May 7, 1927

MEDICAL SCIENCE FOR EVERYDAY USE—Shields Warren—*Lea & Febiger* ($2). A compendium of useful knowledge about health problems of interest to everyone clearly and simply written.

Science News-Letter, May 7, 1927

SHOULD WE BE VACCINATED?—Bernhard J. Stern—*Harper & Brothers* ($1.50). The history of vaccination with a useful summary of the existing legislation on the subject.

Science News-Letter, May 7, 1927

Floods Foretold

(*Continued from page 286*)

haps the most exact forecasting that we do," said Dr. Charles F. Marvin, chief of the U. S. Weather Bureau. "The prediction side is far ahead of the prevention measures that can be taken."

The bureau's flood warnings are instantly heeded by the people of the region involved, even though the country at large hears very little about a flood until the water reaches an alarming state. The dykes are strengthened, inhabitants are notified. But along the lower Mississippi many thousands of the people are negro farmers and laborers and their families, people who often stick to their homes and trustingly climb up to the rooftops when the river menaces them, rather than escape when warned.

Many of these river dwellers, even if they have escaped with their lives, have now seen their homes wrecked. They have lost their best chance to plant their cotton or other crops, and unless the weather favors them, they may fail to get a crop in at all.

So long as men try to hold the Mississippi and its contributing streams within narrow bounds, so long men will have to keep close watch on the flood hazard, according to Dr. Marvin. In past ages, the river handled the problem in its own way, and made huge drainage areas. But men have built over 2,000 miles of levees to guide the river within a convenient channel. The levees are supposed to stand the strain of the torrent and they hold up remarkably, but if the water seeps in through a small leak in the wall, the rift may grow and the flood may force its way through, as it did at Dayton in the famous flood of 1913. Even though the walls of the levees are buitl higher and higher, and though they are pushed back from the river bank, even two miles in some places, the river may in emergencies demand and take more room.

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ENGINEERING

Urges Flood Control Tests

A few hundred dollars spent in a laboratory study of floods would prevent millions of dollars loss, John R. Freeman, former president of the American Society of Civil Engineers and the American Society of Mechanical Engineers, said recently in commenting on the Mississippi floods.

"The Federal Government and the States have spent hundreds of millions of dollars in trying to solve the Mississippi's problems, but it is still possible for one break in a levee to lay waste 5,000 square miles of as fertile land as the sun shines on, with a loss of $25,000,000 almost overnight," said Mr. Freeman, who accompanied President Roosevelt on his official inspection of the completed Panama Canal in the capacity of expert adviser. He was also consulting engineer for the Chinese government, and has studied flood and river problems in that country.

"A week's work with a model, in which changes of shape and position can be readily made at a total cost of a few hundred dollars, may tell more than six months' effort and $10,000 spent on an experimental dike or groyne in the field."

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GENERAL SCIENCE

Science Service Meeting

The annual meeting of Science Service, Inc., the institution for the popularization of science, was held April 28 and two new members of the board of trustees were elected. Dr. David White, home secretary of the National Academy of Sciences, was named by that body as one of its three representatives upon the board and Marlen E. Pew, editor of the weekly publication, *Editor and Publisher,* was chosen as a representative of the journalistic profession. Trustees reelected were: Dr. D. T. MacDougal, director of the Desert Laboratory, Tucson, Ariz., representing the American Association for the Advancement of Science, Dr. C. G. Abbot, acting secretary of the Smithsonian Institution, representing the National Research Council; and Thomas L. Sidlo of Cleveland, Ohio, representing the E. W. Scripps Estate; John H. Finley of the New York Times, representing the journalistic profession.

Dr. W. E. Ritter, director emeritus of the Scripps Institution for Oceanography and instrumental in the organization of Science Service, was again chosen president. Dr. Vernon Kellogg, permanent secretary of the National Research Council, was elected vice-president and chairman of the executive committee and Dr. J. McKeen Cattell, editor of Science, was elected treasurer. These officers, with Dr. White and Mr. Pew, were chosen to constitute the executive committee.

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Note that you can slip out any article without fear of damaging another article in which you might be interested, since editorial matter printed on the right-hand pages is backed by advertising, standing matter or a continuation of the article on the other side.

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GB Physical geography.
GC Oceanology and oceanography.
GF Anthropogeography.
GN Anthropology. Somatology. Ethnology. Ethnography. Prehistoric archæology.
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GT Manners and customs.
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HC Economic history and conditions. National production.
HE Transportation and communication.
HF Commerce.
HM Sociology. General.
L Education.
M Music.
N Fine arts.
P Philology and linguistics.
Q Science. General.
QA Mathematics.
QB Astronomy.
QC Physics.
QD Chemistry.
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110 Metaphysics
120 Special metaphysical topics
130 Mind and body
140 Philosophical systems
150 Mental faculties. Psychology
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170 Ethics
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190 Modern philosophers
200 RELIGION—
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220 Bible
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290 Ethnic. Non-Christian
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690 Building
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720 Architecture
730 Sculpture
740 Drawing. Decoration. Design
750 Painting
760 Engraving
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820 English
830 German
840 French
850 Italian
860 Spanish
870 Latin
880 Greek
890 Minor languages
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Anniversaries of Science

May 13, 1897—Marconi's telegraph was given a long-distance trial without reflectors or resonance plates across Bristol Channel, England. The apparatus at first did not work, but lengthening the antennae saved it.

Marconi had improved on Hertz's original sender so considerably that when he demonstrated his invention before the British postoffice officials in 1897 on Salisbury Plain, he transmitted signals four miles. And yet there was not a single original element in his apparatus. This is not said to his discredit. Morse's telegraph, indeed every epoch-making invention, is usually a new combination of old elements, producing a new result. That Marconi is a great inventor, that he has the imagination that always makes great inventors, is proved by the mere fact that, for all their great attainments, Hertz, Branly, Lodge, and Popoff never dreamed of signaling through space, although they were experimenting with the electromagnetic waves almost daily for long periods.

Marconi discovered that his range could be increased if he elevated the wire constituting part of the sending circuit and connected it with the ground. Thus elevated, the wire looked for all the world like the feeler of some gigantic insect, and hence it came to be called an "antenna." Wires were similarly elevated at the receiving station with corresponding good effect. . . .

—Kaempffert: *Signaling and Talking by Radio* in *A Popular History of American Invention.*

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May 14, 1796—Jenner, an English country doctor, inoculated James Phipps, age 8, with cowpox. Later he inoculated the boy with smallpox, which did not react. This was the first experimental proof of the efficacy of vaccination.

The more accurately to observe the progress of the infection, I selected a healthy boy, about eight years old, for the purpose of inoculation for the Cow Pox. The matter was taken from a sore on the hand of a dairymaid (Sarah Nelmes), who was infected by her master's cows, and it was inserted, on the 14th of May, 1796, into the arm of the boy by means of two superficial incisions, barely penetrating the cutis, each about half an inch long.

On the seventh day he complained of uneasiness in the axilla, and on the ninth he became a little chilly, lost his appetite, and had a slight headache. During the whole of this day he was perceptibly indisposed, and spent the night with some degree of restlessness, but on the day following he was perfectly well . . . .

In order to ascertain whether the boy, after feeling so slight an affection of the system from the Cow Pox virus, was secure from the contagion of the Small Pox, he was inoculated the 1st of July following with variolous matter, immediately taken from a pustule. Several slight punctures and incisions were made on both his arms, and the matter was carefully inserted, but no disease followed. The same appearances were observable on the arms as we commonly see when a patient has had variolous matter applied after having either the Cow Pox or the Small Pox. Several months afterwards he was again inoculated with variolous matter, but no sensible effect was produced on the constitution.

—Edward Jenner: *An Inquiry into the Causes and Effects of the Variolae Vaccinae, a Disease Discovered in Some of the Western Counties of England, Particularly Gloucestershire and Known by the Name of the Cow Pox.*

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May 16, 1910—The Earth passed through the tail of Halley's comet.

Many readers will recall the return of Halley's comet in 1910. This wanderer comes close to the sun once in 76 years. Halley was the friend of Newton, who aided in the publication of the "Principia," and who used Newton's principles, then newly framed, to compute the orbit of this famous comet of 1682. Halley identified it with the comet observed by Apian in 1531 and by Kepler in 1607, and fixed its return for 1758-9. Sure enough, it reappeared on Christmas day, 1758. Since then it has been observed in 1835 and 1910. The present author saw it from Mount Wilson, California, in the early morning, just as twilight was beginning to show its first faint glow in the east. The comet's head was just below the horizon, and its tail stretched beyond the zenith like a gigantic searchlight beam. It was thought by some that the tail might interpose between the earth and sun on May 16, 1910, and possibly dim the sun's effulgence. But measurements of the solar radiation showed nothing remarkable.

—Abbot: *The Earth and the Stars.*

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EDUCATION

Undiscovered Genius

Quotation from THE INFLUENCE OF NURTURE UPON NATIVE DIFFERENCES. By Truman L. Kelley. New York: The Macmillan Co.

The churchman's view of the Middle Ages, "Oddity is an evil and must be cut off," is the schoolman's view of today. Its persistence throughout the ages points to its deep root in human nature—that is, in the psychology of the one who has control of others. Not until the teacher gives up the desire to cast all others in the high mold represented by himself will the resentment of oddity cease. . . .

When established social routines are forsworn we find chess-playing and musical geniuses of ages 8 or 10, and when we do, we immediately pity the poor distorted creatures and exercise our beneficent influence to round them out, and we succeeed so well that these youthful geniuses are seldom heard of in later life. Only a few creep through the barrage, and a few others avoid it by being neglected waifs as children and shunned as peculiar as adolescents, so that it is only when full blown that they are "discovered" as saviors of mankind. Why should we not have hundreds of such where we now have tens? We, the schoolmen of America, can have, if we open our hearts to the concept that frequently in the small frames that pass in review before us are greater minds and larger visions than our own.

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CHEMISTRY

Benzene

This week's prize winning poem in the Science Service scientific poetry contest.

Go drill your wells for compounds aliphatic,
You're welcome to the oils and gasoline;
But let me have the spirits aromatic
Derived from old C_6H_6, benzene.

The custom is to speak of him politely,
As "parent compound" of what chemists call
The aromatic series, but more lightly
He's named "primeval grandpa" of them all.

Consider all the products without number—
Explosives, plastics, flavors, perfumes, dyes—
Which serve us while we work or play or slumber,
Or please our tongues, our noses and our eyes.

They're made from plain old benzene or his cousins,
With hexagons all trimmed in varied styles;
Each new arrangement leads to more by dozens,
With C, H, N, S, O in ranks and files.

If you desire a task to keep you busy,
Just study coal tar and the benzene ring;
Your head may whirl and leave you somewhat dizzy,
But you will find there's system in the thing.
For me, I'd rather work with Crum Brown-Gibson's
Ingenious rule of where new groups should go
Than ponder over plays like Henrik Ibsen's
Or conjugate the Latin verb for know.

—*Julian F. Smith.*

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The Years Have Taught Us

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